cryostat 12, which may already contain a fluid F or may be filled after the bearing is in place. It should be appreciated at the outset that the term "fluid" is used herein to denote any substance that is capable of flowing, as may include fluid suspensions, gases, gaseous suspensions, or the like, without limitation. The vessel 16 for holding the fluid is shown as being cylindrical in shape and may have an open top. Alternatively, it may be completely sealed from the ambient environment to avoid the potential for fluid contamination or leakage during mixing, or adapted to pump the fluid F from an inlet to an outlet in the vessel 16 (see Figure 2). In any case, the vessel 16 may be fabricated of any material suitable for containing fluids, including glass, plastic, metal, or the like. Of course, the use of lightweight plastic or other high density polymers is particularly desirable if the vessel 16 is going to be discarded after mixing or pumping is complete, as set forth in more detail in the description that follows. - -

In the Claims

Please amend claim 1 as follows:

1. (Amended) A system for pumping or mixing a fluid in a vessel, comprising:

a magnetic pumping or mixing element for placement in the vessel;

at least one superconducting element for levitating said magnetic pumping or mixing element;

a wall defining a chamber around the superconducting element, said chamber thermally isolating the superconducting element from the vessel;

a cooling source thermally linked to said superconducting element;

a motive device for rotating said superconducting element.

Please amend claim 6 as follows:

6. (Amended) The system for pumping or mixing a fluid according to claim 1, wherein said levitating magnetic pumping or mixing element further includes a first permanent magnet positioned adjacent to said superconducting element but external to said wall.

Please amend claim 7 as follows:

7. (Amended) The system for pumping or mixing a fluid according to claim 6, wherein said magnetic pumping or mixing element further includes a second permanent magnet spaced from said first permanent magnet for forming a magnetic coupling with said superconducting element, whereby said magnetic coupling serves to transmit driving torque from said superconducting element to said magnetic pumping or mixing element.

Please amend claim 8 as follows:

8. (Amended) The system for pumping or mixing a fluid according to claim 7, wherein said motive device for said superconducting element includes a motor.

Please cancel claim 9 without prejudice.

Please amend claim 10 as follows:

10. (Amended) The system for pumping or mixing a fluid according to claim 1, wherein said wall is below said magnetic pumping or mixing element and the vessel rests atop said wall.

Please amend claim 12 as follows:

12. (Amended) The system for pumping or mixing a fluid according to claim 1, wherein the vessel includes an inlet and an outlet and said rotating magnetic pumping or mixing element includes at least one blade for creating a pumping action that forces fluid to move from said inlet to said outlet.

Please amend claim 13 as follows:

13. (Amended) The system for pumping or mixing a fluid according to claim 1, wherein said vessel is completely sealed and said magnetic pumping or mixing element serves to mix the fluid only.

~~Please amend claim 14 as follows~~:

14. (Amended) The system for pumping or mixing a fluid according to claim 1, wherein the vertical center axis of rotation of the magnetic pumping or mixing element is offset from the vertical center axis of the vessel.

Please amend claim 21 as follows:

21. (Amended) The system for pumping or mixing a fluid according to claim 16, wherein said chamber housing said superconducting element is positioned below said magnetic pumping or mixing element in said vessel.

~~Please amend claim 22 as follows~~:

22. (Amended) The system for pumping or mixing a fluid according to claim 16, wherein the vessel is supported by a stable support structure positioned between said superconducting element and said magnetic pumping or mixing element.

~~Please amend claim 23 as follows~~:

23. (Amended) The system for pumping or mixing a fluid according to claim 16, wherein the magnetic pumping or mixing element includes first and second magnets having different polarities to create a non-symmetrical magnetic field with respect to an axis of rotation of said superconducting element.

Please amend claim 24 as follows:

24. (Amended) The system for pumping or mixing a fluid according to claim 16, wherein the magnetic pumping or mixing element includes at least one low-profile rod carrying first and second magnets, wherein said rod is capable of being inserted in a relatively narrow opening in the vessel.

Please amend claim 25 as follows:

25. (Amended) The system for pumping or mixing a fluid according to claim 16, wherein the magnetic pumping or mixing element includes a pair of interconnected rods that are substantially orthogonal to each other in a nominal position with each rod carrying first and second magnets having the same polarities.

Please cancel claims 29-36 without prejudice.

Please amend claim 39 as follows:

39. (Amended) The system for pumping or mixing a fluid according to claim 1, further including a transmitter for transmitting a signal or receiver for receiving the signal, and wherein either said magnetic pumping or mixing element or the vessel includes one of the transmitter or the receiver and the other is positioned adjacent to said superconducting element, wherein the operation of said motive device is restricted until the signal generated

by the transmitter is received by said receiver.

Please cancel claim 41 without prejudice.

Please amend claim 42 as follows:

42. (Amended) The system for pumping or mixing a fluid according to claim 1, wherein the vessel is a pipe, the superconducting element includes at least two superconducting members each thermally separated or isolated from the outer surface of the pipe, and said pumping or mixing element includes at least two levitation magnets, each corresponding to one of said at least two superconducting members, whereby said magnetic pumping or mixing element is levitated in said pipe as a result of the interaction between said superconducting members and the corresponding levitation magnets.

~~Please amend claim 43 as follows:~~

43. (Amended) The system for pumping or mixing a fluid according to claim 42, wherein said magnetic pumping or mixing element further includes a plurality of alternating polarity driven magnets.

~~Please amend claim 44 as follows:~~

44. (Amended) The system for pumping or mixing a fluid according to claim 43, wherein the motive device includes a bearing positioned outside of said pipe for rotatably supporting a driving magnet assembly carrying a plurality of alternating polarity driving magnets, a motor, and an endless belt for transmitting rotary motion from said motor to said driving magnet assembly, wherein the driving magnet assembly upon rotating creates a varying magnetic field that influences said driven magnets and causes said magnetic

pumping or mixing element to rotate.

Please amend claim 45 as follows:

45. (Amended) The system for pumping or mixing a fluid according to claim 43, wherein the motive device includes a winding positioned external to said pipe and a power supply for supplying an electrical current to said winding, wherein said winding creates an electrical field that causes said levitating magnetic pumping or mixing element to rotate in said pipe.

Please amend claim 46 as follows:

46. (Amended) The system for pumping or mixing a fluid according to claim 1, wherein said pumping or mixing element includes at least one levitation-assist chamber for holding a substance that is lighter than the fluid in said vessel, whereby the chamber assists in levitating the magnetic pumping or mixing element in the fluid.

Please amend claim 47 as follows:

47. (Amended) The system for pumping or mixing a fluid according to claim 1, wherein the motive device is a first motive device, and further including a second motive device for moving the superconducting element relative to the vessel, whereby effective, non-localized pumping or mixing action may be provided.

Please amend claim 50 as follows:

50. (Amended) A system for mixing a fluid, comprising:

a vessel for holding the fluid;

a magnetic pumping or mixing element for positioning in said vessel;

a superconducting element for levitating and forming a magnetic coupling with said magnetic pumping or mixing element;

a housing defining a chamber around said superconducting element for thermally isolating said superconducting element from said vessel;

a cooling source thermally linked to said superconducting element; and

a motive device for rotating said superconducting element.

Please amend claim 52 as follows:

52. (Amended) The mixing system according to claim 50, wherein said vessel includes an inlet and an outlet and said magnetic pumping or mixing element further includes at least one blade or vane for creating a pumping action that forces fluid to move from said inlet to said outlet.

Please amend claim 54 as follows:

54. (Amended) The mixing system according to claim 50, wherein said vessel and magnetic pumping or mixing element are disposable.

~~Please amend~~ claim 55 as ~~follows:~~

55. (Amended) A system for pumping or mixing a fluid in a vessel positioned on a stable support structure, comprising:

a magnetic pumping or mixing element for placement in the vessel;

at least one superconducting element for levitating said magnetic pumping or mixing element;

a cooling source thermally linked to said superconducting element in said

chamber;

a motive device for rotating said superconducting element.

Please amend claim 59 as follows:

59. (Amended) The system for pumping or mixing a fluid according to claim 56, wherein said chamber housing said superconducting element is positioned below said magnetic pumping or mixing element in said vessel.

Please amend claim 60 as follows:

60. (Amended) The system for pumping or mixing a fluid according to claim 55, wherein said magnetic pumping or mixing element includes at least one blade or vane, whereby said blade or vane provides the desired pumping or mixing action when the pumping or mixing element is rotated.

Please amend claim 61 as follows:

61. (Amended) The system for pumping or mixing a fluid according to claim 55, wherein said vessel is a centrifugal pumping head having an inlet and an outlet, wherein the rotation of said magnetic pumping or mixing element causes the fluid to move from the inlet to the outlet.

Please amend claim 63 as follows:

63. (Amended) The system for pumping or mixing a fluid according to claim 55, wherein the vessel is supported by a stable support structure positioned between said superconducting element and said magnetic pumping or mixing element.

Please amend claim 64 as follows:

64. (Amended) The system for pumping or mixing a fluid according to claim 55, wherein the magnetic pumping or mixing element includes first and second magnets having different polarities to create a non-symmetrical magnetic field with respect to an axis of rotation of said superconducting element.

Please amend claim 66 as follows:

66. (Amended) The system for pumping or mixing a fluid according to claim 55, wherein the magnetic pumping or mixing element includes at least one low-profile rod carrying first and second magnets having the different polarities, said rod being capable of insertion in a relatively narrow opening in the vessel.

Please amend claim 67 as follows:

67. (Amended) The system for pumping or mixing a fluid according to claim 55, wherein the magnetic pumping or mixing element includes a pair of interconnected rods that are substantially orthogonal to each other in a nominal position, each carrying first and second magnets having the same polarity.

Please amend claim 70 as follows:

70. (Amended) A system for pumping or mixing a fluid in a vessel, comprising:

a magnetic pumping or mixing element for placement in the vessel;

a superconducting element for levitating said magnetic pumping or mixing element;

a wall defining a chamber around the superconducting element, said chamber thermally isolating the superconducting element from the vessel;

a cooling source thermally linked to said superconducting element;

a motive device for rotating said magnetic pumping or mixing element, wherein at least a portion of said motive device is positioned adjacent to and concentric with the superconducting element.

Please amend claim 73 as follows:

73. (Amended) The system for pumping or mixing a fluid according to claim 72, further including a platform in said chamber for supporting the superconducting element, wherein the platform is thermally linked to the cooling source.

Please amend claim 77 as follows:

77. (Amended) The system for pumping or mixing a fluid according to claim 70, wherein said motive device includes a shaft carrying a plurality of alternating polarity driving magnets corresponding to a plurality of driven magnets on said magnetic pumping or mixing element, said driving magnets being received in a thermally separated or isolated bore formed by the wall defining the chamber around said superconducting element.

~~Please~~ amend claim 78 as follows:

78. (Amended) The system for pumping or mixing a fluid according to claim 77, wherein said magnetic pumping or mixing element comprises:

a levitation magnet corresponding in size and shape to the superconducting element;

at least two driven magnets having opposite polarities, said driven magnets being aligned with the corresponding driving magnets of said motive device,

whereby said levitation magnet levitates said pumping or mixing element while said driven magnets transmit rotary motion to said pumping or mixing element from said driving magnets.

Please amend claim 80 as follows:

80. (Amended) The system for pumping or mixing a fluid according to claim 70, wherein said magnetic pumping or mixing element carries at least one blade or vane.

Please amend claim 82 as follows:

82. (Amended) The system for pumping or mixing a fluid according to claim 70, wherein the vessel is a pipe, the wall defining the chamber thermally isolating the superconducting element is positioned inside of said pipe and includes a thermally separated or isolated bore for receiving a driven shaft carrying a plurality of alternating polarity driving magnets forming a part of said motive device and magnetically coupling with a plurality of corresponding driven magnets in or on said magnetic pumping or mixing element.

~~Please amend claim 83 as follows:~~

83. (Amended) A system for pumping or mixing a fluid in a vessel, comprising:

a magnetic pumping or mixing element for placement in the vessel;

at least one superconducting element for levitating said magnetic pumping or mixing element;

a wall defining a chamber around the superconducting element, said chamber thermally isolating the superconducting element from the vessel;

a cooling source thermally linked to said superconducting element;

a first motive device for rotating said magnetic pumping or mixing element or said superconducting element;

a second motive device for moving the superconducting element relative to the vessel,

whereby moving the superconducting element ensures that effective, non-localized pumping or mixing action is afforded by the levitating, rotating pumping or mixing element.

Please cancel non-elected claims 86-93, without prejudice.

Please amend claim 94 as follows:

94. (Amended) A system for pumping or mixing a fluid in a vessel, comprising:

a magnetic pumping or mixing element for placement in the vessel;

at least one superconducting element for levitating said magnetic pumping or mixing element;

a cooling source thermally linked to said superconducting element;

a motive device for rotating one of said magnetic pumping or mixing element or said superconducting element,

wherein said pumping or mixing element includes at least one levitation-assist chamber for holding a substance that is lighter than the fluid in said vessel, whereby the chamber assists in levitating the magnetic pumping or mixing element in the fluid.

Please amend claim 96 as follows:

96. (Amended) The system for pumping or mixing a fluid according to claim 94,

wherein said levitating magnetic pumping or mixing element further includes a first permanent magnet positioned adjacent to said superconducting element and a second permanent magnet spaced from said first permanent magnet for forming a magnetic coupling with a drive magnet forming a part of said motive device.

Please cancel non-elected claims 98-110 without prejudice.

Please amend claim 111 as follows:

111. (Amended) A method of levitating and rotating a magnetic pumping or mixing element for pumping or mixing a fluid, comprising:

placing the magnetic pumping or mixing element in the vessel;

levitating the magnetic pumping or mixing element above a superconducting element positioned in an evacuated or insulated chamber adjacent to the vessel and thermally linked to a cooling source; and

rotating the superconducting element to induce rotation in the magnetic pumping or mixing element in the vessel.

Please amend claim 112 as follows:

112. (Amended) The method according to claim 111, further including the steps of placing said magnetic pumping or mixing element in the vessel prior to filling the vessel with a fluid, and after mixing or pumping is completed, disposing of said magnetic pumping or mixing element and vessel.

Please amend claim 113 as follows:

113. (Amended) The method according to claim 112, including the step of completely

sealing the vessel prior to rotating said magnetic pumping or mixing element.

Please amend claim 114 as follows:

114. (Amended) The method according to claim 111, wherein the magnetic pumping or mixing element includes at least two magnets having different polarities to create a non-symmetrical magnetic field relative to an axis of rotation of said superconducting element.

Please amend claim 115 as follows:

115. (Amended) The method according to claim 111, wherein the vessel is a flexible bag for containing the fluid, and the method further includes placing the pumping or mixing element in the flexible bag prior to filling the bag with the fluid.

Please amend claim 116 as follows:

116. (Amended) A method of levitating and rotating a magnetic pumping or mixing element for pumping or mixing a fluid, comprising:

placing a magnetic pumping or mixing element carrying first and second magnets having different polarities to create a non-symmetrical magnetic field in a vessel;

levitating the magnetic pumping or mixing element in the vessel using a superconducting element;

rotating the superconducting element to induce rotation in the pumping or mixing element.

Please amend claim 117 as follows:

117. (Amended) A method of levitating and rotating a magnetic pumping or mixing element for pumping or mixing a fluid, comprising:

placing a magnetic pumping or mixing element in the vessel;

levitating the magnetic pumping or mixing element in the vessel using a superconducting element;

rotating the magnetic pumping or mixing element using a driving magnet positioned adjacent to and concentric with the superconducting element.

Please cancel non-elected claims 118-122, without prejudice.

Please amend claim 123 as follows:

123. (Amended) A method of levitating and rotating a magnetic pumping or mixing element for pumping or mixing a fluid in a vessel, comprising:

placing the magnetic pumping or mixing element in the vessel;

levitating the magnetic pumping or mixing element above a superconducting element positioned in an evacuated or insulated chamber adjacent to the vessel and thermally linked to a cooling source;

rotating the magnetic pumping or mixing element in the vessel;

moving the superconducting element relative to the vessel,

whereby the rotating magnetic pumping or mixing element follows the movement of the superconducting element to ensure that effective, non-localized pumping or mixing action is provided.

Please amend claim 124 as follows:

124. (Amended) The method according to claim 123, wherein the step of rotating the magnetic pumping or mixing element includes rotating the superconducting element, and

wherein the step of moving the superconducting element includes moving the superconducting element to and fro relative to the vessel in a linear fashion.

Please add new claims 125-158:

125. (New claim) The pumping or mixing system of claim 1, wherein the pumping or mixing element is a magnetic bearing, impeller, rotor or other means for generating a pumping or mixing action in a fluid.

126. (New claim) The pumping or mixing system of claim 50, wherein the pumping or mixing element is a magnetic bearing, impeller, rotor or other means for generating a pumping or mixing action in a fluid.

127. (New claim) The pumping or mixing system of claim 55, wherein the pumping or mixing element is a magnetic bearing, impeller, rotor or other means for generating a pumping or mixing action in a fluid.

128. (New claim) The pumping or mixing system of claim 70, wherein the pumping or mixing element is a magnetic bearing, impeller, rotor or other means for generating a pumping or mixing action in a fluid.

129. (New claim) The pumping or mixing system of claim 83, wherein the pumping or mixing element is a magnetic bearing, impeller, rotor or other means for generating a pumping or mixing action in a fluid.

130. (New claim) The pumping or mixing system of claim 94, wherein the pumping or mixing element is a magnetic bearing, impeller, rotor or other means for generating a pumping or mixing action in a fluid.

131. (New Claim) A system for pumping or mixing a fluid in a vessel, comprising:

a magnetic rotor or impeller for placement in the vessel, either before or after the fluid is introduced, said rotor or impeller including at least one pair of alternating polarity driven magnets;

at least one superconducting element for levitating said magnetic pumping or mixing element and forming a magnetic coupling with said alternating polarity driven magnets;

a cryostat including an evacuated or insulated chamber in which the superconducting element is positioned, said chamber thermally isolating the superconducting element from the vessel;

a cooling source thermally linked to said superconducting element;

a motive device for rotating said superconducting element to induce rotation in the levitating impeller or rotor via the magnetic coupling.

132. (New Claim) The system of claim 131, wherein the cooling source is a refrigerator or a container of liquid cryogen.

133. (New Claim) A system for pumping or mixing a fluid in a vessel, comprising:

a magnetic structure having an axially non-symmetric magnetic field for placement in the vessel;

at least one superconducting element for levitating said magnetic structure and forming a non-contact coupling with said levitating magnetic structure;

a cryostat including an evacuated or insulated chamber for thermally separating

or isolating the superconducting element from the vessel and a cooling source thermally linked to said superconducting element; and

a motive device for rotating said superconducting element,

whereby the rotation of the superconducting element induces rotation in the magnetic structure which in turn pumps or mixes the fluid when present in the vessel.

134. (New Claim) The system of claim 133, wherein the magnetic structure includes at least two alternating polarity magnets held together or embedded in a matrix material.

135. (New Claim) A system for pumping or mixing a fluid in a vessel, said system including at least one stable support structure, comprising:

a magnetic pumping or mixing element for placement in the vessel, said magnetic pumping or mixing element including at least two alternating polarity driven magnets creating an axially non-symmetric magnetic field;

at least one superconducting element for levitating said magnetic pumping or mixing element and forming a coupling therewith;

a cryostat including a wall defining a chamber around the superconducting element, said chamber thermally isolating the superconducting element from the vessel, said cryostat rotatably supported by a bearing assembly supported by the stable support structure;

a cooling source thermally linked to said superconducting element;

a motor coupled to said cryostat by an endless belt, wherein said endless belt transfers the rotary motion produced by said motor to cause said cryostat and hence said superconducting element to rotate.

136. (New Claim) The system of claim 135, wherein the wall is an outer wall of the cryostat.

137. (New Claim) The system of claim 135, wherein the cooling source is a refrigerator or a liquid cryogen container.

138. (New Claim) The system for pumping or mixing a fluid according to claim 135, wherein the vessel is a pipe, the superconducting element includes at least two superconducting members each thermally separated or isolated from the outer surface of the pipe, and said pumping or mixing element includes at least two levitation magnets, each corresponding to one of said at least two superconducting members, whereby said magnetic pumping or mixing element is levitated in said pipe as a result of the interaction between said superconducting members and the corresponding levitation magnets.

139. (New Claim) A system for pumping or mixing a fluid in a vessel using a magnetic structure having an axially non-symmetric magnetic field for placement in the vessel, comprising:

at least one superconducting element for levitating said magnetic structure and forming a non-contact coupling with said levitating magnetic structure;

a cryostat including an evacuated or insulated chamber for thermally separating or isolating the superconducting element from the vessel and a cooling source thermally linked to said superconducting element; and

a motor coupled to said cryostat by an endless belt, wherein said endless belt transfers the rotary motion produced by said motor to rotate said cryostat and said

superconducting element together,

whereby the rotation of the superconducting element induces rotation in the magnetic structure which in turn pumps or mixes fluid when present in the vessel.

140. (New Claim) The system of claim 139, wherein the magnetic structure includes at least one impeller blade or vane.

141. (New Claim) A system for pumping or mixing a fluid in a vessel, comprising:

a pumping or mixing element for placement in the vessel, said pumping or mixing element including at least two driven magnets;

a superconducting element for levitating the pumping or mixing element;

a cooling source thermally linked to said superconducting element;

a rotary motive device including at least two driving magnets, each of which form a magnetic coupling with one of the driven magnets for transmitting torque to said magnetic pumping or mixing element, wherein at least a portion of said motive device is positioned adjacent to and concentric with the superconducting element.

142. (New Claim) The system of claim 141, wherein the drive magnets and driven magnets have alternating polarities.

143. (New Claim) A system for pumping or mixing a fluid in a vessel, comprising:

a pumping or mixing element for placement in the vessel, said pumping or mixing element including at least two driven magnets;

a cryostat including an evacuated or insulated chamber in which an annular superconducting element having a center opening is positioned, said chamber thermally

isolating the superconducting element from the vessel;

a cooling source thermally linked to said superconducting element;

a motor having a rotating shaft for rotating at least two driving magnets positioned in the center opening of the annular superconducting element and hence adjacent to and concentric therewith, with each of the driven magnets forming a magnetic coupling with one of the driven magnets for transmitting torque to said magnetic pumping or mixing element.

144. (New Claim) The system of claim 143, wherein the chamber holding the annular superconducting element is annular and defines a bore or opening for receiving the at least two driving magnets.

145. (New Claim) A system for pumping or mixing a fluid using a pumping or mixing element for placement in a vessel, said pumping or mixing element including at least two driven magnets, said system comprising:

a cryostat including an evacuated or insulated chamber in which an annular superconducting element having a center opening is positioned, said chamber thermally isolating the superconducting element from the vessel;

a cooling source thermally linked to said superconducting element;

a motor for rotating at least two driving magnets positioned in the center opening of the annular superconducting element and hence adjacent to and concentric therewith, with each of the driven magnets forming a magnetic coupling with one of the driven magnets for transmitting torque to said magnetic pumping or mixing element.

146. (New Claim) The system of claim 145, wherein the motor includes a shaft that carries or supports the at least two driving magnets.

147. (New Claim) A method of levitating and rotating a magnetic pumping or mixing element for pumping or mixing a fluid in a vessel, comprising the steps of:

levitating the magnetic pumping or mixing element in the vessel using an annular superconducting element having a center opening;

rotating the magnetic pumping or mixing element using a driving magnet structure positioned in the center opening of the superconducting element and magnetically coupled to the magnetic pumping or mixing element.

148. (New Claim) The method of claim 147, further including the step of positioning the annular superconducting element in an evacuated or insulated chamber in a cryostat and cooling the annular superconducting element using a cooling source to hold the superconducting element at or below a transition temperature.

149. (New Claim) The method of claim 147, further including the step of field cooling the annular superconducting element before levitating the magnetic pumping or mixing element.

150. (New Claim) The method of claim 147, wherein the step of field cooling includes placing a charging magnet in proximity to the superconducting element while cooling the superconducting element to at or below a transition temperature.

151. (New Claim) The method of claim 147, wherein the step of rotating includes forming a magnetic coupling between a pair of driving magnets and a pair of driven magnets

on or in the pumping or mixing element and then rotating the pair of driving magnets.

152. (New Claim) A method of levitating and rotating a magnetic pumping or mixing element for pumping or mixing a fluid, comprising:

placing the magnetic pumping or mixing element in the vessel;

levitating the magnetic pumping or mixing element above a superconducting element;

forming a magnetic coupling between the pumping or mixing element and the superconducting element;

rotating the superconducting element to induce rotation in the magnetic pumping or mixing element in the vessel as a result of the magnetic coupling.

153. (New Claim) The method according to claim 152, further including the steps of cooling the superconducting element in accordance with a field cooling protocol before levitating or rotating the pumping or mixing element and positioning the superconducting element in an evacuated or insulated chamber adjacent to the vessel.

154. (New Claim) A method of levitating and rotating a magnetic pumping or mixing element for pumping or mixing a fluid in a vessel using an annular superconducting element, including one cooled to at or below a transition temperature in accordance with a field cooling protocol, comprising the steps of:

levitating the magnetic pumping or mixing element in the vessel using the superconducting element;

forming a magnetic coupling between a driving magnet structure positioned

in a center opening of the annular superconducting element and the magnetic pumping or mixing element;

rotating the magnetic pumping or mixing element using the driving magnet structure.

155. (New Claim) A method of levitating and rotating a magnetic pumping or mixing element for pumping or mixing a fluid in a vessel using a superconducting element, including one cooled to at or below a transition temperature in accordance with a field cooling protocol, comprising:

levitating the magnetic pumping or mixing element in the vessel using the superconducting element;

forming a magnetic coupling between the superconducting element and the magnetic pumping or mixing element;

rotating the superconducting element.

156. (New Claim) A method of pumping or mixing a fluid using the system of claim 1.

157. (New Claim) A method of pumping or mixing a fluid using the system of claim 50.

158. (New Claim) A method of pumping or mixing a fluid using the system of claim 55.

159. (New Claim) A method of pumping or mixing a fluid using the system of claim 70.

160. (New Claim) A method of pumping or mixing a fluid using the system of claim 83.